

- 1 Calculate the discriminant of the quadratic  $y = 3x^2 - 5x + 4$ .  
Use this to determine how many solutions the equation has.  
[3 marks]
- 3 Find the points of intersection between the graph  $y = x^2 + 5x - 3$  and the line  $y = 2x + 1$ .  
[3 marks]
- 7 (a) Express  $2x^2 - 5x + k$  in the form  $a(x - b)^2 + c$   
[3 marks]
- 7 (b) Find the values of  $k$  for which the curve  $y = 2x^2 - 5x + k$  does **not** intersect the line  $y = 3$   
[3 marks]

- 5 Prove that, for integer values of  $n$  such that  $0 \leq n < 4$

$$2^{n+2} > 3^n$$

[2 marks]

6. (i) Use a counter example to show that the following statement is false.

“ $n^2 - n - 1$  is a prime number, for  $3 \leq n \leq 10$ .”

(2)

- (ii) Prove that the following statement is always true.

“The difference between the cube and the square of an odd number is even.”

For example  $5^3 - 5^2 = 100$  is even.

(4)